

We claim:

- 95 1 A dielectric gate material to reduce current leakage from the silicon substrate to the polysilicon gate, prevent boron penetration in p-channel devices, and reduce electron trapping in the dielectric, comprising calcium oxide.
- 2 A method of preparing a dielectric gate material to reduce current leakage from a silicon substrate to a polysilicon gate, prevent boron penetration in a p-channel device, and
100 reduce electron trapping in the dielectric, comprising saturating the surface of a silicon wafer with hydroxyl groups, heating a calcium halide to a temperature at which the vapor pressure of said calcium halide is sufficient to achieve atomic layer deposition, transporting said calcium halide to said silicon wafer,
105 transporting gaseous water to said silicon wafer, transporting gaseous calcium to said silicon wafer, and transporting gaseous water to said silicon wafer.
- 3 A method according to claim 2, wherein said calcium halide is calcium bromide.
- 4 A method according to claim 2, further comprising repeating the steps of transporting
110 gaseous calcium to said silicon wafer and transporting gaseous water to said silicon wafer, until a desired thickness of the dielectric gate material has been achieved.
- 5 A method according to claim 4, wherein said calcium halide is calcium bromide.
- 6 A method of preparing a dielectric gate material to reduce current leakage from a silicon substrate to a polysilicon gate, prevent boron penetration in a p-channel device, and
115 reduce electron trapping in the dielectric, comprising saturating the surface of a silicon wafer with hydroxyl groups,

heating a calcium halide to a temperature at which the vapor pressure of said calcium halide is sufficient to achieve atomic layer deposition,

transporting said calcium halide to said silicon wafer, and

120 transporting gaseous water to said silicon wafer.

7 A method according to claim 6, wherein said calcium halide is calcium bromide.

8 A method according to claim 6, further comprising repeating the steps of transporting said calcium halide to said silicon wafer and transporting gaseous water to said silicon wafer, until a desired thickness of the dielectric gate material has been achieved.

125 9 A method according to claim 8, wherein said calcium halide is calcium bromide.